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**A “Random Walk” Down the Past Decade**

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## **Some Observations on Turkish Inflation: A “Random Walk” Down the Past Decade**

**By C. Emre Alper\* and Murat Ucer\*\***

Reducing inflation has become a key policy issue in Turkey. We study short-term dynamics of Turkish inflation to contribute to a better understanding of this important problem. We provide a broad-brushed review of issues related to high and chronic inflation, offer some observations on the Turkish inflation, and discuss the implications of all these on disinflation. It is hard to contest that inflation is a fiscal problem in Turkey. Nevertheless, there are some additional issues that are worth thinking about, namely that, inflation seems largely inertial, has some characteristics typical of high and chronic inflation processes elsewhere, and there are reasons to believe that the economy might have been stuck in a high inflation equilibrium largely resulting from a host of coordination problems rather than economic fundamentals, per se. One implication of all these for a disinflation program is that *overall* costs of disinflation might be less severe than one might think.

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**“Destroying a money is not easy. It takes years and years of dedicated work” (Dornbusch, 1996)**

## **I. Introduction**

The inflation threat appears to have disappeared in most parts of the world, rekindling debate over the feasibility and desirability of “zero” inflation.<sup>1</sup> With annual inflation slightly below 100 percent at end-1997, Turkey is obviously not yet part of this new trend. Perhaps more striking, in 1996, Turkey was the eighth highest inflation country in the world after Angola, Democratic Republic of Congo (formerly, Zaire), Sudan, Bulgaria (which has now stabilized), Venezuela, Tajikistan, and Turkmenistan (IMF, 1997) and is the largest economy of its kind still suffering from high and chronic inflation of this sort.

Somewhat encouraging though, a consensus slowly appears to be emerging that inflation is perhaps the most significant economic problem facing Turkey and its origin mainly lies in fiscal imbalances, or perhaps more broadly stated, in the inefficiencies imposed by a bloated public sector. Furthermore, the current Government has indicated its intentions to reduce inflation and adopted an inflation target of 50 percent for end-1998 as part of its economic program, following long debates and quarrels on how to reduce inflation and on the relative costs of gradual versus shock therapy approaches. Despite these steps, however, it seems that very few studies ventured to take a systematic look at many issues involved.<sup>2</sup> Moreover, it appeared from a reading of the media that the debate, at times, suffered from important misconceptions.<sup>3</sup>

The main motivation behind this paper is to explore some of the key issues involved, provide a background for “thinking about high inflation” in the Turkish context, and hence contribute to a better understanding of this important problem. In what follows, we provide a broad-brushed review of issues related to high and chronic inflation, offer some observations on the Turkish inflation, and discuss the implications of all these on a disinflation program. What we say in this paper is simple. It is hard to contest that inflation is a fiscal problem in Turkey. Nevertheless, there are some additional issues that are worth thinking about, namely that, inflation seems largely inertial, has some

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<sup>1</sup> See, for example, Romer and Romer (1997) and Fischer (1996a).

<sup>2</sup> There are of course several informative studies on Turkish inflation. To name a few, see Akcay et. al. (1996), Anand and Van Wijnbergen (1989), Onis and Ozmucur (1990), Rodrik (1991), Ozatay (1992), Uygur (1992), and Metin (1995). Also see Kipici et. al. (1997) who look at the leading indicator properties of a wide set of economic series on inflation in a time series context. Our objective is somewhat different in that we concentrate on a more recent period at high (monthly) frequency and explore a number of modern themes with a view to contributing to the ongoing debate on Turkish inflation/disinflation.

<sup>3</sup> A recent short essay by Dani Rodrik of Harvard University in the Turkish daily *Milliyet* (November 15, 1997) points out “three misconceptions” of the inflation debate in Turkey. First misconception is the belief that a “gradual” disinflation scenario will be less costly. Second misconception is to think that fiscal and monetary restraint alone can reduce inflation. Third misconception is the presumption that a disinflation program will necessarily be costly. These views are elaborated in an interview with Dani Rodrik (See Rodrik, 1997).

characteristics typical of high and chronic inflation processes elsewhere, and there are reasons to believe that the economy might have been stuck in a high inflation equilibrium largely resulting from a host of coordination problems rather than economic fundamentals, per se. One implication of all these for a disinflation program is that *overall* costs of disinflation might be less severe than one might think.

The paper is organized as follows. Section II provides a survey on a wide array of phenomena related to high and chronic inflation where we discuss the “fiscal” versus the “balance of payments” views, the concept of inertial inflation, as well as some analytical issues concerning disinflation programs. Our survey suggests that the use of a nominal anchor during disinflation programs is a good idea with strong analytical foundations; despite some elegant early work showing otherwise, recessions during disinflation programs is not inevitable; and heterodox programs might be more effective than orthodox programs in disinflating from high and chronic inflation, if implemented correctly.

In Section III, we begin by providing some observations on Turkish inflation. First, we explore how volatility and persistence of monthly inflation has evolved over time and discuss some of the political and economic events around it. We observe that over the past decade, inflation has jumped twice to a new plateau, its persistence has increased in 1988, but its variability has remained largely unchanged. Second, we show that the empirical link between fiscal imbalances and inflation is weaker than one might think, despite the consensus view that the very source of inflation in Turkey is fiscal imbalances. We suggest a simple resolution to this apparent paradox: the consequences of deficits depend on how they are financed. In our view, heavy reliance on bond-finance since 1986 coupled with strong inertial elements largely explain why ever-growing fiscal deficits have not *yet* led to much higher inflation. Third, we observe that inflation has increased side-by-side with a visible erosion in TL-denominated monetary aggregates with seigniorage revenue somewhat declining. However, the economy has managed to maintain a certain level of liquidity through “innovations”, most notably foreign exchange deposits and “repos”, as typical in many high and chronic inflation economies. Fourth, the monetary and exchange rate policy framework throughout the history of “modern” central banking in Turkey, i.e. since the mid-1980s, could never afford to focus on inflation reduction. Instead, the “real exchange rate rule” of the authorities as well as heavy reliance on domestic bond market for the financing of fiscal deficits made the policy stance largely accommodative. Finally, we note that inflation dynamics are considerably effected from discrete adjustments to public sector prices, which at times follow the political cycles, by aggravating inflation in some periods and suppressing in others.

In a separate sub-section, we venture to identify the predictive content of various theories of inflation and determine the extent of inertia by applying standard time series techniques in a multivariate setting. We find that inertia is indeed what drives inflation in the short run. As to sources of inertia, we suggest that the monetary and exchange rate policy framework in place since the early 1980s has been the critical element driving it, more so than others such as relative price variability and wage indexation. As a follow-up

to our argument on the accommodative policy stance of the authorities, we present suggestive evidence that the real exchange rate rule which has been central to the monetary and exchange rate policy framework throughout, has been an important factor in driving inflation.

In the light of this background, we discuss some aspects of an appropriate disinflation strategy for Turkey. We suggest that, given the strong inertia in inflation dynamics and the seemingly weak link between “economic fundamentals” and the level of inflation *in the short-run*, it would be appropriate to design a program with “heterodox” elements. Given that the exchange rate and monetary policy framework largely drive the source of inertia, any serious disinflation attempt should take into account a fundamental reorientation in this area. The least that can be done is to reorient the monetary and exchange rate policy framework toward one whereby *nominal* exchange rate takes a more central role. More ambitious steps would include a fundamental currency reform or a currency board-type arrangement. In Section IV, we offer some concluding remarks.

## II. On Theories of High Inflation<sup>4</sup>

While the models of “output gap” and “policy credibility” seem to account for a substantial portion of medium- and long-term movements in inflation for industrial countries (IMF, 1996; Romer and Romer, 1997), for developing economies, one could encounter “a dizzying array of phenomena” including budget deficits, supply shocks, external debt, exchange rate crises, incomes policies, the choice of nominal anchors, the frequency of price adjustment and inflation inertia, real wage behavior, real interest rates and bankruptcies, and distributional conflicts (Ball, 1993; Paldam, 1994). The so-called structuralist versus the monetarist debates of the late 1970s, once the organizing framework for these complex set of phenomena (Cordoso and Helwege, 1992), now seems to have been replaced by studies that test the predictive content of “fiscal” versus the “balance of payments” views and explore the role of inertia in the inflationary process (Montiel, 1989; Montiel and Ostry, 1993; Kamas, 1995; and Agenor and Hoffmaister, 1997).<sup>5</sup> In what follows, we first try to look at these issues and then try to distill some lessons from the vast literature on stopping high inflation.

### a. Sources of inflation

The **fiscal or the seigniorage view** (henceforth the seigniorage view) originated in the seminal work of Phelps (1973), is perhaps the closest thing to a consensus view as a model of inflation dynamics. The approach has found some sort of an application in

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<sup>4</sup> We should perhaps note at the outset that a distinction is commonly drawn between hyperinflation, high and chronic inflation, and moderate-to-low inflation. In this paper, we only cover issues associated with high and chronic inflation.

<sup>5</sup> In a more recent work, Calvo and Vegh (1997) suggest five broad theories behind high and persistent inflation process which include inflation as an optimal tax, shocks and accommodation, multiple equilibria, the “provinces” effect, and war of attrition.

almost all countries that suffer from high and chronic inflation.<sup>6</sup> The main argument of the seigniorage view is that, while it is true that “inflation is always and everywhere a monetary phenomenon” viz. Milton Friedman’s famous dictum, a situation of sustained monetary growth unmatched by a commensurate increase in money demand is generally driven by ongoing fiscal imbalances, and thus inflation is rather “always and everywhere a *fiscal* phenomenon”. The simplest analytics of the seigniorage view typically center around a fiscal deficit equation financed mostly by money creation, and a Cagan-type money demand function. In this set-up, a seigniorage-maximizing inflation rate is solved for, as the inverse of the coefficient of expected inflation term in the money demand equation.<sup>7</sup> One of the main insights that comes out of the seigniorage view, rigorously worked out in Bruno and Fischer (1990), is that there may be “multiple equilibria” of low and high inflation for *a given level of deficit*, and that the economy may have to live with a higher rate of inflation “than warranted by fundamentals”, the fundamentals referring to the level of fiscal deficit. Alternatively stated, the economy may be stuck on the *wrong side* of -- what is called -- the seigniorage-Laffer curve. The insight has the important policy message that,

“...allowing monetary policy to accommodate fiscal pressures not only leaves the inflation rate to be determined by the fiscal authority, but – because of the possibility of multiple equilibria – also increases the likelihood that the economy will find itself operating at an inflation rate higher than it need be” (Bruno and Fischer, 1990).

The alternative **balance of payments view** takes exchange rate depreciations arising from balance of payments crises as the principal cause of inflation. The most common mechanism is explained in Montiel and Ostry (1993),

“[...] exchange rate depreciations in turn raise the rate of inflation by increasing expectations of inflation, which are then accommodated by the monetary authorities or through a wage indexation mechanism. The latter would occur if the frequency of indexation increases due to inflationary expectations associated with a devaluation. With more frequent wage adjustments, a higher rate of inflation is required to maintain an equilibrium real wage.”

As to the accommodative stance of the monetary authorities, a key issue relates to the role of “real exchange rate rules”. It has long been argued that countries who implement these rules for a long period of time risk losing control over the inflationary process and that rapidly increasing inflation may result under certain conditions (Adams and Gros, 1986). The main insight is based on the so-called *monetary approach to balance of payments*: that monetary and exchange rate policies are two equivalent, but mutually exclusive, ways to determine inflation in the long run. Given this fundamental relationship between monetary and exchange rate policy, *a real exchange rate rule is essentially a policy of full monetary accommodation: any shock to the price level is validated 100 percent through the exchange rate and, by way of balance of payments,*

<sup>6</sup> To cite a few good examples, see Cordoso (1991) on Brazil, Anand and VanWijnbergen (1989) and Rodrik (1991) on Turkey, and the papers in Easterly et al. (1994) on a variety of developing countries.

<sup>7</sup> Recently, however, Easterly et al. (1995) warned against such static calculations, arguing that the semi-elasticity of money demand with respect to inflation varies with inflation.

*through the money supply*. Although this may take time initially, as the economy becomes more open and exposure to balance of payments volatile flows increase, the link between monetary and exchange rate policies gets tighter. As a result, the economy begins to experience the implications of “real exchange rate rule” on inflation dynamics much stronger.

**Inertia** has become central to understanding high and chronic inflation phenomena, as experienced in inflation episodes of the 1980s, mainly in Latin America. While in itself not quite a *source* of inflation, it has been a good explanation for why it may be difficult to stop inflation (Little et al., 1993). Inertia may best be defined as a process where *the existence of inflation today is largely explained by the existence of inflation in the past* (Bruno, 1991; 1993; Dornbusch and Fischer, 1993; Dornbusch, 1996). In empirical studies, this has meant high explanatory power of lagged values of inflation on inflation itself, after controlling for conventional variables such as monetary aggregates, exchange rate, demand shocks, wages. Experience suggests that inertia results from prolonged periods of inflation. A good basic account of what creates inertia is provided in Paldam (1994) who cites mainly three factors: (i) (accumulation and decumulation of) expectations; (ii) institutional arrangements that encourage indexation of labor and financial contracts; and (iii) relative price adjustments (where an initial jump in some prices is followed by subsequent jumps in others with some overshooting, hence keeping the process going). One could add the exchange rate to this list, following Blejer (1981), or more broadly, the real exchange rate rule of the monetary authorities along the lines discussed in Adams and Gros (1986). The importance of inertia derives from the fact that its existence fundamentally alters the disinflation recipe so that it becomes necessary to support conventional measures of demand restraint, i.e. monetary and fiscal policies, with measures that tackle inertia directly. We now elaborate on this issue and a number of related themes below.

## **b. Stopping high inflation**

In this section, we review three conceptual issues that are pertinent to the stopping of high and chronic inflation. Why do we need a “nominal anchor” to disinflate? What do we know on the nature of the business cycle associated with disinflation programs? What is the main distinction between orthodox versus heterodox programs?

*Why do we need a “nominal anchor” to disinflate?*

The need to use a nominal anchor<sup>8</sup> during disinflation programs may perhaps best be motivated in reference to the so-called “classical dichotomy”, extensively studied in the

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<sup>8</sup> A “nominal anchor” is a nominal variable that by policy decision is fixed or set on a predetermined and announced path to help stabilize the price level (Mecagni, 1995). In principle, either the money supply or the price of a central commodity – goods, labor or foreign exchange – can serve as an anchor. The key issue is that it needs to be visible and act as a coordinating device for price expectations. Another important issue is the relative performance of money versus the exchange rate as nominal anchors. A consensus seems to have emerged on this issue that exchange rate is the more favored anchor in that, it is easier to follow and money-based programs tend to suffer from a host of problems arising from instability and unpredictability of money demand.

seminal work of Don Patinkin (Patinkin, 1965). The classical dichotomy is about the division of economic variables into real and nominal (monetary) components.<sup>9</sup> In a dichotomized system, the *real* variables – the relative prices of goods, real incomes, real expenditures and the like – are determined independently of the level of *nominal* variables through the familiar general equilibrium supply and demand functions. Demand and supply depend on all relative prices and real factor endowments, and the equilibrium relative prices can be solved as functions of the exogenous variables in the system such as factor endowments. The key issue is that, in such a system, *a scaling of all prices up or down by a constant, say k, does not alter equilibrium relative prices*. Absolute prices, however, are effected by such scaling as they are determined on the monetary side of the economy viz. the familiar “quantity theory of money” relationship, i.e.  $MV=PQ$  (where M is money supply, V is velocity, P is price level, Q is real output). With V and Q given by the real side of the economy, the level of M determines the level of P. If the authorities do not set M so that it could act as a coordinating device for expectations and price adjustments, the price level (hence inflation) becomes indeterminate.<sup>10</sup>

*What do we know on the nature of the business cycle associated with disinflation programs?*

Chronic and high inflation countries, most notably those in Latin America, have adopted many stabilization programs during the last few decades.<sup>11</sup> In a series of seminal papers, Calvo and Vegh argued that stabilization programs are recessionary, i.e. costly, sooner or later, depending on the type of the “nominal anchor” used.<sup>12</sup> Specifically, programs that relied on a money-anchor experienced recession right upon the inception of the stabilization program, while those that used the exchange rate anchor experienced booms initially which subsequently turned into recessions. As the exchange rate was the more commonly used anchor, a “conventional wisdom” developed around the consequences of exchange rate-based programs (Vegh, 1992).<sup>13</sup>

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<sup>9</sup> This paragraph is based on Adams and Gross (1986) and Patinkin (1993).

<sup>10</sup> In plain English, economic agents come to some sort of an equilibrium where, say 5 apples exchange with 3 oranges, given tastes and preferences. Once the system comes to an equilibrium at this exchange ratio, it does not matter whether the *nominal* relative price is 5-to-3, 10-to-6, 100-to-60. It does matter, however, for the absolute price level and its path, that is inflation. It is perfectly plausible, therefore, to envisage a situation where contemporaneous price adjustments by agents continue without altering relative positions, but with price level increasing at a constant rate, k. Hence the need for an anchor as a coordinating device.

<sup>11</sup> Vegh (1992) divides them into three groups: Latin American heterodox programs of the 1960s; Southern cone stabilization programs of the late 1970s; and heterodox programs of the mid-1980s.

<sup>12</sup> For a summary of the basic framework and the arguments, see Calvo and Vegh (1992, 1997). The Calvo-Vegh argument is largely based on the Latin American programs of a certain period and the mechanism they have in mind is quite specific, one that centers around the agents’ “incentive to engage in intertemporal substitution” where credibility plays a central role. We should also note that their arguments cover the “demand side” of the story. More recently, there has been exploration from the supply side. See Roldos (1995) and Rebelo and Vegh (1995). Also see Agenor and Montiel (1996) for a nice summary of all these issues.

<sup>13</sup> For instance, most of the countries reviewed in Mecagni (1995) implemented exchange-based programs.



A comprehensive recent empirical study by Easterly (1996) of 28 stabilization episodes during 1960-1994 is more encouraging on the fate of disinflation programs,

“When stabilizing from high inflation, a short answer to the question ‘when are stabilizations expansionary?’ is: most of the time. The experience of expansionary stabilization is now sufficiently widespread that the traditional assumption that stabilization is generally contractionary seems no longer viable. The formerly bold suggestion that stabilization is neutral now looks timid in the light of experience. Even the politics of stabilization looks like a winner, if the electoral political landslides of Menem and Fujimori are any guide”

We could add to this list, perhaps, Brazil’s President Cardoso who was the Minister of Finance at the time of the Real Plan. Furthermore, some specific episodes of disinflation such as Israel 1985, Mexico 1988, as well as relatively less-studied “new generation” of disinflation programs such as Brazil’s Real Plan of early 1994 are more promising in that inflation reduction seemed to have lasted while severe recessions were avoided.<sup>14</sup>

*What is the main distinction between orthodox versus heterodox programs?*

“Orthodox” programs are those that target sharp reductions in inflation *through demand restraint alone, namely tight fiscal and monetary policies*, while “heterodox” programs, in addition to financial policies, *target fixity of incomes and key prices*. The latter could have several components, in particular, (i) exchange rate stabilization; (ii) wage controls or an incomes policy; and (iii) price controls. Evidence on the performance of heterodox program in disinflation is mixed.<sup>15</sup> The consensus view, it seems, is best-summarized in a recent paper on the post-Real Plan developments in Brazil by R. Dornbusch. Speaking about one of the many ill-fated stabilization (heterodox) programs of Brazil prior to the implementation of the Real Plan, Dornbusch notes,

“[...] Since Brazil’s inflation was not the outcome of inflationary money creation – the Government was perfectly able to finance itself in the capital market – it was altogether plausible to use the stopping of wage-price process as the central disinflationary measure. It was not plausible, however, to take advantage of the prevailing calm by immediately stepping up demand with a major expansion. The boom was short-lived, price controls became binding, and markets became distorted. (The government ultimately had to use the air force to round up the cattle that were being withheld from the market.) not surprisingly, the episode ended in a wave of corrective inflation” (p.373, in Dornbusch, 1997).

Heterodoxy seems to take into account that high inflation is a “nominal” problem, which is the outcome of a host of coordination problems and inertia and chooses to deal with the problem directly. The main reason why heterodox programs fail, it seems is not quite the

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<sup>14</sup> In the case of Mexico, the foreign exchange crisis of 1994 should not be interpreted as resulting from flaws associated with exchange rate-based program, but rather authorities’ insistence on using the exchange rate as an anchor for “too long” and failure to “exit” with the right timing. For instance, see Fischer (1996b).

<sup>15</sup> Heterodox programs are critically reviewed by, among others, Kiguel and Liviatan (1992), Meltzer (1994), and Little et. al. (1995).

very “logic” of it, but rather that, let alone tightness, an extreme spending spree is accommodated by loose financial policies in an environment with imperfect credibility.

In Sum, our review suggests that: (i) nominal anchor may be useful as a coordinating device when inflation is high and chronic; it is our understanding that most stabilization programs use the exchange rate as the anchor owing to ease of visibility as well as a host of problems arising from money demand instability and unpredictability during disinflation; (ii) recession during disinflation programs is not inevitable; (iii) heterodox programs might be more effective than orthodox programs, in disinflation from high and chronic inflation, if executed right.

### **III. On Turkish Inflation**

Turkey experienced very high inflation for the first time during 1979-80 amid a balance of payments crisis. At some 100 percent, this was in sharp contrast with the experience of the 1960s and 70s when annual inflation averaged less than 10 percent per annum. An effective stabilization program, launched in early 1980, the beginning of what would later be coined the “Ozal decade” (Rodrik, 1991), reduced inflation dramatically in a year’s time through a combination of tight financial policies and significant reforms, most notably those geared toward correcting the disequilibria in the external and financial sectors. In this period, the economy has opened up rapidly.<sup>16</sup> Following the sharp reduction in inflation, however, macroeconomic balances began to deteriorate in the mid-1980s, and thereafter annual inflation in Turkey has never been lower than 50 percent (month-on-month, CPI-based) and has had a tendency to gradually increase in a “familiar” step-wise manner (Chart 1).

Casual empiricism suggests that the dynamics of inflation between the two periods -- the sharp acceleration and drop around 1980 and thereafter -- would differ substantially. In the former period, inflation was driven by balance of payments problems and a large disequilibria in an extensively controlled foreign exchange market, significant supply shortages in a heavily import-dependent economy, delayed responses to strong adverse external shocks of the 1970s, and loose financial policies. Most importantly, perhaps, the economy had no history of high and chronic inflation then. In the latter period, important changes had taken place. By late 1980s, Turkey has had become a fairly open economy with no substantive balance of payments constraint, thanks to a “real exchange rate rule” and increasingly sophisticated financial markets, but rapidly deteriorating fiscal balances and a new generation that is yet to live with an annual inflation rate less than 50 percent.<sup>17</sup>

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<sup>16</sup> This episode has been studied extensively. See, for instance, Kopits (1987) and Aricanli and Rodrik (1990).

<sup>17</sup> Turkey began to implement a real exchange rate rule in May 1981 to maintain/enhance competitiveness. Although officially abandon in 1988, the rule has been a major preoccupation for policy-makers all along. In the post-1994 crisis period, the rule has come back to the agenda as strong as ever, as evidenced in the relative stability of the real exchange rate.

*The main theme that we explore in the following sub-sections is the possibility that the economy might have had “no anchor” in this latter period with the lead-lag relationship among the key nominal variables, namely the prices, exchange rate, and the monetary aggregates, slowly disappearing and inflation assuming an increasingly inertial nature. Notwithstanding the importance of “fundamentals” in driving inflation, most notably that of fiscal disequilibria, this is to say that inflation appears to have taken a “life of its own”.*

We now pull together some observations that might be important in thinking about high inflation and disinflation in Turkey. We then run a simple time series exercise to quantify the extent of inertia in the inflationary process and surmise on what might be driving inertia. Finally, we suggest that disinflation should be top priority on the agenda and its costs are not as high as one might think, if the “nominal” dimension of the problem is taken into account.

#### **a. Some observations**

*“ Since the mid-1980s, inflation has taken a typical “plateau” character, with two notable jumps occurring in 1988 and 1994. While inflation persistence appears to have increased in 1988, its variability does not seem to have changed.*

The jump in 1988 can be explained by a “naï ve application” of the seigniorage view along the lines discussed in Rodrik (1991): the opening of the capital account and the subsequent increase in dollarization led to a sharp reduction in the demand for reserve money which then forced the fiscal authorities to jack up the inflation rate to stabilize the level of seigniorage revenue. As the authorities’ disinflation program, launched in early February 1988 was derailed by political instability, economy got stuck at a new, higher level of inflation (Onis and Reidel, 1993). Judging from the sharp appreciation in the real exchange rate in this period as well as no notable recovery in the demand for TL-denominated aggregates in the post-stabilization period, one could argue that stabilization efforts throughout the period lacked credibility, most likely because it did not receive adequate support from fiscal policy. The next jump in inflation occurred during the 1994 foreign exchange crisis.<sup>18</sup> After a dramatic jump following the crisis, inflation came down sharply, but settled at a level once again higher than the level prior to the crisis. Similar to the 1988 episode, one could argue that this reflected lack of credibility in the April 5 package, despite IMF’s support; the program eventually collapsed due to, yet again, political instability.

As shown in Chart 3, there was an increase in the persistence of inflation at around the time of the 1988 stabilization efforts, which indicates perhaps public’s loss of confidence in the battle over inflation in the face of deteriorating fiscal balances. Interestingly, however, higher mean inflation did not seem to have given rise, at least thus far, to higher variability (Chart 2). This implies that although inflation has had a plateau nature, once shifted to the new level, it has had a tendency to revert back to monthly averages prior to

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<sup>18</sup> The details of the latter are discussed in Ozatay (1996).

the jump. This implies that there must be something stable about the way public forms its expectations, which we suspect could arise from the exchange rate policy of the authorities: in the absence of a sharp acceleration in the rate of depreciation, the public did not feel the urge to raise monthly inflation expectations any higher. Once the jump occurred and the environment stabilized, they had no problem in reverting back to where they were earlier, guided by the *real* exchange rate policy of the authorities.

*“There is now widespread consensus that the root cause of inflation in Turkey is fiscal imbalances. This is, however, a relation difficult to establish when faced with actual data.*

As Charts 4 and 5 suggest the correlations between fiscal disequilibria and inflation are fairly weak during the 1986-96 period. This is not an unusual result, as most extensively argued, among others, in Easterly et al. (1994). As noted earlier, the literature that emphasizes that inflation is a fiscal phenomenon, adds almost immediately a qualifier that, “the origins of which are mainly found in the *monetary* financing of persistent fiscal deficits” (Dornbusch, 1996 and Cavallo, 1996).

As shown in Charts 6 and 7, deficit-finance in Turkey has relied heavily on bond-finance, with the importance of money-finance gradually declining, particularly in the post-crisis period. In 1997, for instance, the Central Bank did not use any advances from the Government and bond-finance from domestic markets was the only source of finance, given that net external financing was yet again negative. As discussed further below, this is good for inflation in the short-term, but not sustainable, viz. the “unpleasant monetarist arithmetic” Sargent and Wallace (1985), and will have to be inflationary sooner or later.

*“There has been a significant erosion of the demand for TL-denominated monetary aggregates over the past 15 years, with seigniorage revenue also showing signs of a gradual decline.*

Charts 8 and 9 suggest that TL-denominated aggregates as well as seigniorage revenue have been shrinking as percent of GDP, as typical in high inflation environments. As noted by Patinkin (1993), speaking about the economic developments prior to Israel’s 1985 program, one of the “simple truths of monetary theory” is indeed the permanent downward shift in the demand for domestic currency denominated monetary aggregates. In such circumstances, as in Turkey after the 1994 crisis, high interest rates become the natural price to pay to maintain the demand for TL-denominated assets. Recent increase in “repo” may be seen in this light as the most recent “innovation” that the system has found in the face of a growing public debt and ongoing instability; earlier it was dolarization. Overall, these developments have contributed to the weakening of the link between money and inflation in Turkey and complicated monetary control by the Central Bank.

*“Despite substantive reforms and sophistication in the conduct of monetary and exchange rate policy, inflation was never the ultimate policy goal of the monetary authorities for a sufficiently long period of time.*

Reforms of the financial and external sectors speeded up in the second part of the 1980s, leading to important changes in the way financial sector operates and the Central Bank conducts its monetary policy. Following substantial efforts to build an infrastructure, the monetary policy implementation has begun to shift from direct to indirect instruments of monetary control.<sup>19</sup> Early in the history of “modern” central banking in Turkey, balance sheet restructuring was the overriding goal.<sup>20</sup> The first objective, that of modernizing the institutional environment of monetary policy implementation, has been fairly successful. Later on, largely owing to the ongoing domestic financing need of the Government as well as the “real exchange rate rule” in place, financial market stability has become the key objective (CBT, 1996).<sup>21</sup> Inflation, except for some short-lived attempts, was in fact a “residual” objective. As a result, shocks to inflation were accommodated by a monetary and exchange rate policy framework whose focus was primarily the stability in interest and exchange rates. More explicitly, stability in the financial markets meant that net domestic assets and net foreign assets, the two components of reserve money, would be subordinated to interest and exchange rate stability respectively, implying that the sum, that is reserve money can not be controlled except under special circumstances.

*“The behavior of public sector prices has important impact on inflation and bears a close relationship to the political calendar.”*

As indicated in Charts 11 and 12, important jumps have occurred throughout in the public sector component of WPI. These jumps complicated the dynamics by aggravating inflation in certain periods and suppressing in others. While in themselves they could not drive inflation in the long-term, short-term dynamics were greatly effected from the behavior of controlled prices, as shown more rigorously in Ozatay (1992).

## **b. A vector autoregression exercise**

In this sub-section, we run an unrestricted vector autoregression (VAR) to test the predictive content of fiscal versus the balance of payments views as well as to explore the impact of inertia and public sector prices on inflation.<sup>22</sup> The VAR includes monthly percentage changes in the *price level* (both CPI and WPI in turn), *exchange rate basket* (the central bank buying rate as a weighted average of the U.S. Dollar and the Deutsche Mark with weights of 40 percent and 60 percent, respectively), various measures of *money* (central bank money (M0) and more traditional aggregates (M1, M2, M2Y)), and three exogenous variables (a constant, a dummy for 1994 crisis, and the controlled

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<sup>19</sup> See Agenor, McDermott, Ucer (1997) for a background.

<sup>20</sup> What we call “modern” period is the latter half of the 1980s, when important steps were taken dramatically reforming the monetary policy environment in Turkey. A lot has been written on this period. See, for instance, Saracoglu (1992) on the logic of monetary program in those days.

<sup>21</sup> Although one could argue that the real exchange rate rule was officially abandoned in 1988, it has been implicitly followed during most of the period, reflecting concerns over competitiveness.

<sup>22</sup> As it is well-known, the VARs are appropriate for cases where the aim is to examine the channels through which a number of variables interact as potentially spurious; *a priori* constraints are not imposed in these models.

component of wholesale price inflation).<sup>23</sup> The sample covers the period 1985:01-1997:09 and all data were obtained from the Central Bank of Turkey web-site ([www.tcmb.gov.tr](http://www.tcmb.gov.tr)). All series were seasonally adjusted by multiplicative X-11 method of the U.S. Bureau of Census. A variety of unit root tests indicate that all data are non-stationary in levels but stationary in percentages.<sup>24</sup> The public sector price inflation was tested for exogeneity and found to be exogenous. It should be noted that given the close link between public sector component of WPI and the political cycles, by controlling for WPI, we also partially control for the political cycle.

The lag selection of the VAR was based on the Akaike's Information Criterion and Schwarz' Bayesian Information Criterion, along the lines discussed in Lutkepohl (1985) and Geweke and Meese (1981). We have found that a VAR that includes 5 lags for each endogenous variable, i.e. a VAR of order 5, passes all specification tests.

In the VARs, two useful tools for short-run dynamic analyses are the impulse response functions (IRF) and variance decompositions (VDC) which help investigate the effects of changes in one variable on all other variables in the model. The IRF shows the expected response of each variable in the system to a one standard deviation shock in one of the systems variables while the VDC indicates the percentage of the expected k-step ahead squared prediction of a variable induced by innovations in another variable. One issue that typically comes across in VAR analysis is the ordering of variables. Since innovations to each variable are in general correlated and they are orthogonalized by Cholesky decomposition – i.e., the variance-covariance matrix of the resulting innovations is diagonal -- the ordering of the variables in the system may be important. However, this problem is not crucial here, as all components of the residual correlation matrix are less than 0.2.

*An inspection of the IRFs and VDCs indicate that inflation is almost completely an inertial phenomenon (Chart 14 and Table 1).*<sup>25</sup> While there is some evidence that the central bank money has some predictive power (in the fourth month), exchange rate has virtually no impact. We attribute the latter to the strong *contemporaneous* correlation between the exchange rate depreciation and inflation. It is well known that exchange rate depreciation is a widely watched variable in the price-setting process. Strong contemporaneous correlation would result when expectations closely mimic the exchange rate depreciations targeted by the Central Bank within the month. Chart 13 is suggestive of this relationship.

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<sup>23</sup> We also included the trend component of the industrial production index as well as an output gap measure to control for supply side factors and overheating, respectively, but they turned out insignificant and were dropped from the system. We attribute the lack of correlation between these and inflation series to data problems and leave it to be explored later.

<sup>24</sup> These results as well as the VAR estimates discussed below are available from the authors upon request.

<sup>25</sup> We report the results based on Central Bank money only. The other monetary aggregates yielded similar results and are available from the authors upon request.

### c. Sources of inertia

An empirical examination of the sources of inertia is a very difficult exercise. As noted above, inertia may be caused by expectations, relative price adjustments, institutional arrangements that support indexation of wages and financial contracts, and monetary and exchange rate policy framework of the authorities. Wage indexation has been extensively studied as the most common source of inertia in high and chronic inflation economies. In Turkey, wage indexation has arguably had limited effect in driving inertia largely owing to a reasonably “flexible” labor market.<sup>26</sup> Similarly, indexation of financial contracts is also not common. Being a fairly dollarized economy as measured by the size of foreign exchange deposits in the banking system as well as the pricing of most “big ticket items” in dollar terms, dollarization provides a natural index to price shocks. However, its impact runs through the exchange rate and not through explicit financial contracts. As to relative price variability-inflation link, we performed a simple test. We constructed a monthly series of inflation variability from the 21 sub-components of private wholesale price index, and looked at the “causal” relationship between inflation-variability and its mean. In economies where relative price variability is a driving source of inflation, we would expect inflation variability to Granger-cause inflation. However, we could not reject the null of no-Granger causality in either direction which suggest that relative price variability is not a driving source of inflation in Turkey.<sup>27</sup> Nevertheless, we did find a strong significant contemporaneous correlation between the two series.

Overall, as discussed above, monetary and exchange rate policy framework centered around a real exchange rate rule, appears to be the driving source of inertia in the Turkish case. We assess the impact of real exchange rate rule on inflation through a simple time series exercise in the spirit of Calvo et. al. (1995). The theoretical model developed therein suggests that when a country follows real exchange rate targeting and in particular, when the monetary authority attempts to depreciate the real exchange rate above its equilibrium level, inflation tends to accelerate. We examined this proposition using Turkish data. We first checked the persistence of temporary shocks to the real exchange rate following Cochrane’s (1988) methodology. As explained in Cochrane (1988), we compared the ratio of the variance of the  $k$ -differences of the real effective exchange rate, to  $k$  times the variance of the first differences of the series. For a pure random walk process, this ratio would be one for any  $k$  and for stationary series it would converge to zero as  $k$  increased. We observe that when  $k$  ranges between one and 48 months, this ratio decreases from 1.18 to 0.72 pointing out to the persistence of temporary shocks in the real exchange rate, hence their importance. Next, we decomposed the real exchange rate series into its trend and cyclical component by making use of the by-now standard Hodrick-Prescott filter<sup>28</sup> and then correlated the cyclical

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<sup>26</sup> Labor market data in Turkey are notoriously bad. See OECD 1994, however, for a nice background on key aspects of Turkish labor market which hint at a fairly flexible structure. Anecdotal evidence also suggests that labor market is comparatively flexible in Turkey.

<sup>27</sup> See Chapter 16 in Leiderman(1993) for similar, but more comprehensive exercise.

<sup>28</sup> HP filter is a high pass linear filter that extracts the long-run component of the series leaving it stationary up to the fourth order. This method uses the partial realization of a stochastic process  $Y$  of length  $T$  and the trend component of the series,  $\tau$ , is selected to minimize the sum of squares

component of the real exchange rate with current inflation rate. We observed that the value for the contemporaneous correlation among inflation and the real exchange rate was high (–0.31) and significant.<sup>29</sup> This implies that any real effective exchange rate devaluation above its trend tends to impose inflationary impact on the exchange rate.<sup>30</sup>

#### d. Disinflating Turkey

How to go about disinflation is a broad topic. We address only two issues here. First, should Turkey care about disinflation at all? Second, can we disinflate the “orthodox” way?

*Should Turkey care about disinflation at all?*

Many seem to argue that high inflation in Turkey is stable and thus it does not hamper growth. In our view, this is a misconception that reduces enthusiasm to form a national consensus toward disinflation as well as a forceful assault on inflation. Can we afford to be complacent on this issue? We think not. As the quote from Dornbusch at the introduction suggests, hyperinflation takes time to arrive but eventually it does. This, we believe, is the key issue. Inflation is stable today because monetization of fiscal deficits has slowed down, thanks to the availability of bond, and indirectly, i.e. through the private sector, external financing. The sustainability of the situation is clearly questionable. It is true that as long as capital account is open and international conjecture permits, fiscal adjustment may be delayed and the exchange rate and prices may dance around stable plateaus. However, the moment external finance slows down, interest rate pressures build up to an extent to threaten sustainability, debt gets monetized. This, it seems, is how most hyperinflations begin. As noted in Little et. al. (1993),

“Naturally, the more debt that is issued, the higher the real rate of interest has to be to induce the private sector to hold the growing stock of debt, and this has further effects on the budget. It increases the deficit and thus leads either to further issue of debt or, eventually, to monetization. Eventually, the growing debt service must lead to increased monetization of the debt, hence to increased inflation later. This is the “unpleasant monetarist arithmetic of Sargent and Wallace (1985), who conclude that a current shift from monetization to debt finance might reduce inflation now, but would increase inflation later, essentially through increasing future budget deficits. Thus shifting from monetization to debt only postpones the problem”.

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$$\sum_{t=1}^T (Y_t - t_t)^2 + \lambda \sum_{t=2}^{T-1} [(t_{t+1} - t_t) - (t_t - t_{t-1})]^2$$

where the first term is the sum of the squared

deviations from trend, and the second term is the multiple  $\lambda$  of the sum of squares of the trend component's second differences. This second term penalizes variations in the growth rate of the trend component, the penalty increasing with the value of  $\lambda$ . For monthly data, we use  $\lambda = 129,600$  as suggested in literature.

<sup>29</sup> Since the null hypothesis of zero correlation has the cut-off point of 0.18 for a sample of 125 observations, which corresponds to the value required to reject the null hypothesis at the 5% level of significance.

<sup>30</sup> These issues, it goes without saying, need to be explored further.



It seems that Turkey is entering a difficult period. There is a lot of pressure already on the financial system, with M2Y declining in real terms in 1997, with the financing made available through the open market operations window reaching unprecedented levels. It appears that this was the case in Brazil until recently. As noted in Garcia (1996), it was “not unusual for the Brazilian central bank to inject a whole monetary base (300 percent of bank reserves) in one single day!” through open market operations.

*Can we disinflate the “orthodox” way?*

As to overall strategy on disinflation, some very thoughtful notes seem to be circulating in the bureaucratic circles.<sup>31</sup> Perhaps two points are worth emphasizing. First, it needs to be recognized that inflation has a “nominal dimension”. That is to say, because of inertia, inflation has a tendency to drive itself, irrespective of economic fundamentals and the real sector. Therefore, not only that a disinflation program does not have to be as costly, but also “aligning fundamentals alone”, may not be the most efficient way to disinflate. The policy implication of all this is that, it may be worthwhile to think of a program with “heterodox components”. As the exchange rate is central to price-setting process in Turkey and seems to be the main source of inertia, it would be the most relevant candidate to coordinate price expectations to break with the inertia. Furthermore, it is visible, bear close links to the final target, and does not suffer from complications pertaining to money demand instability and unpredictability. This needs to be supported, of course, with a number of key structural measures and intelligent and open dialogue with the public.

Second, it would seem plausible to approach to disinflation in two phases. The first, “cold turkey” or “shock therapy” phase would involve taking the economy off the “nominal” equilibrium by going from an inflation rate of 80-100 percent to some 20 percent. And then, once economic environment gets cleared from distortions caused by high inflation and agents get a better sense of their relative (real) positions, the monetary authority should exit the anchor entering the second phase, and use a more flexible framework such as “exchange rate bands” or “inflation targeting” (Leiderman and Bufman, 1996; Bernanke and Mishkin, 1997).

#### **IV. Concluding Remarks**

In this paper, we covered a fairly wide territory. Let us conclude by highlighting a number of points.

- Inflation seems to have a very strong inertial nature and a nominal dimension that is one that has nothing to do with the economy’s real equilibrium. This has most likely been nurtured by the monetary and exchange rate policy framework in effect since the mid-1980s, a key component of which is the “real exchange rate rule”. To break with this, a serious disinflation effort would need to use the nominal exchange rate as the anchor. This, however, would need to be done in the context of a credible program, given the

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<sup>31</sup> See “Anonim Rapor”, in the Turkish Daily Liberal Bakis, December issues.

well known risks associated with “incredible” exchange rate based programs. The “nominal” dimension of the problem becomes even more evident when we look forward. In 1998, the projections are that inflation will come down, exchange rate will go parallel to that; interest rates will come down as inflation comes down; reserve money will grow at least as fast as inflation. It is difficult to gauge the lead-lag structure here.

- Turkey has gotten engaged in an unfortunate debate on the “costs of disinflation”. One has to distinguish between *overall costs* and *distributional costs*. When inflation is high, chronic, and a “nominal” problem, *overall costs* of disinflation, as best-measured by GDP growth, do not need to be high. This is what one could perhaps call “the modified conventional wisdom”. Let us raise a puzzle. Sometime ago in July, IMF’s stabilization program scenarios were published in a Turkish daily (Liberal Bakis, July 10-11). These scenarios indicated that if a disinflation program were to be launched, economic growth would slow down to **3** percent, but inflation would drop down to **24** percent while **current** policies scenario indicated **4** percent growth and **109** percent inflation. The authorities’ program for 1998 also targets **3** percent growth, but a “gradual” reduction in inflation to **50** percent, the latter to avoid the “severe” costs “to the nation” of a sharper reduction in inflation. Since IMF is not known for its “free lunches”, what is it that we are missing here?

- Overall, disinflation, it seems, is a combination of “nominal” measures supported by credible and tangible actions. As we understand it, for instance, Brazil’s Real Plan, as nicely discussed in Dornbusch (1997) and Garantia (1996), is just one good example of how, with sufficient credibility and elegant design, an economy may be taken off the “bad equilibrium”. Argentina’s Convertibility Plan of 1991 and Israel’s extensively studied 1985 episode seem to convey important lessons for Turkey in these regards as well.

- On the question of what, at the end, explains “inflation dynamics” in Turkey, we could perhaps say mostly “inflation itself”. In other terms, there are good reasons to suspect that monthly inflation forecasts coming out of a simple model of “inflation as a function of past-inflation”, could be, on average, almost as good as any other under the current circumstances.

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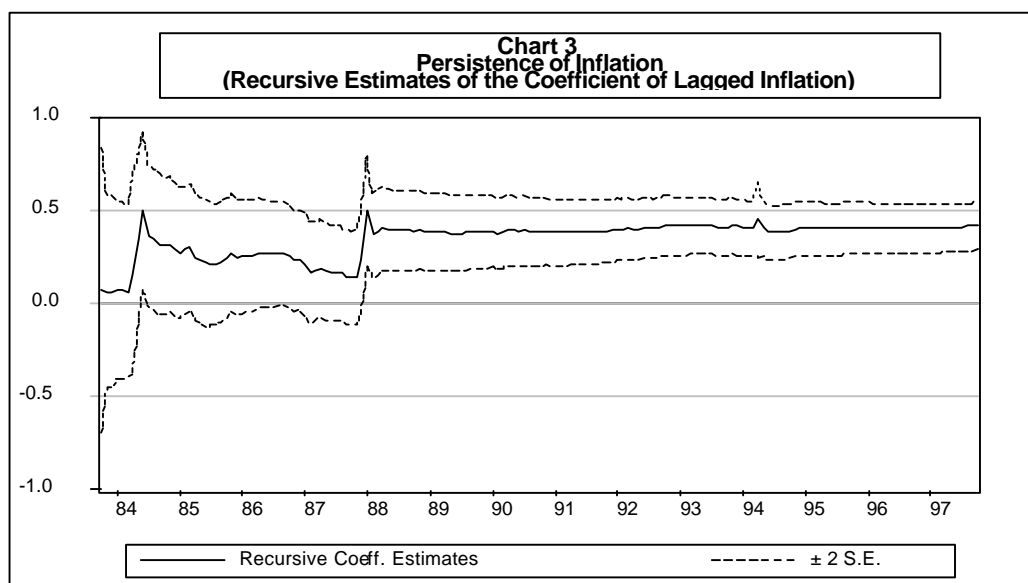
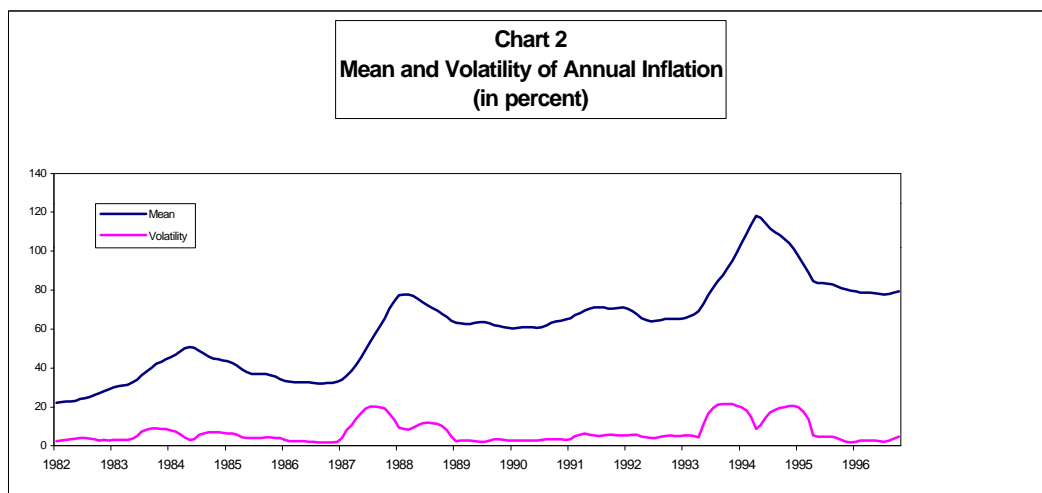
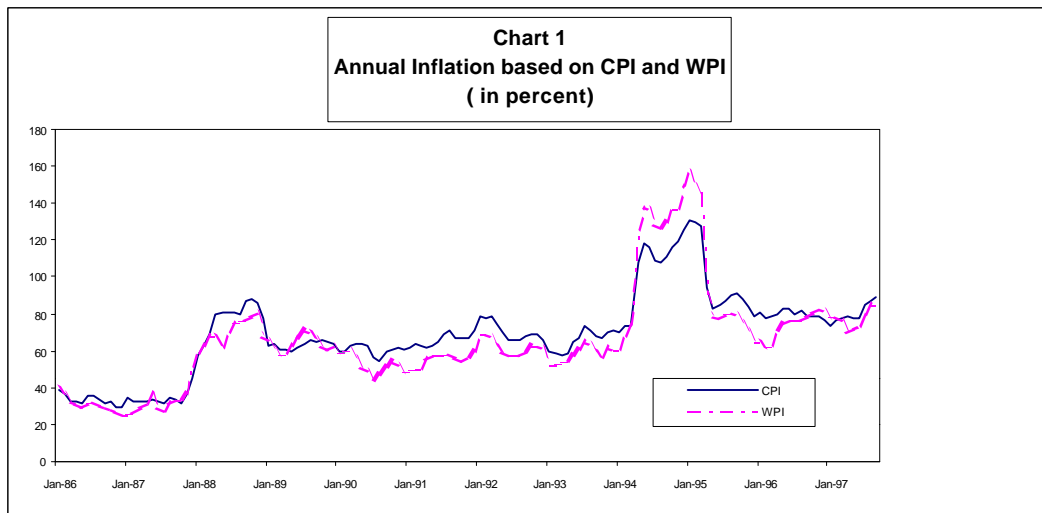
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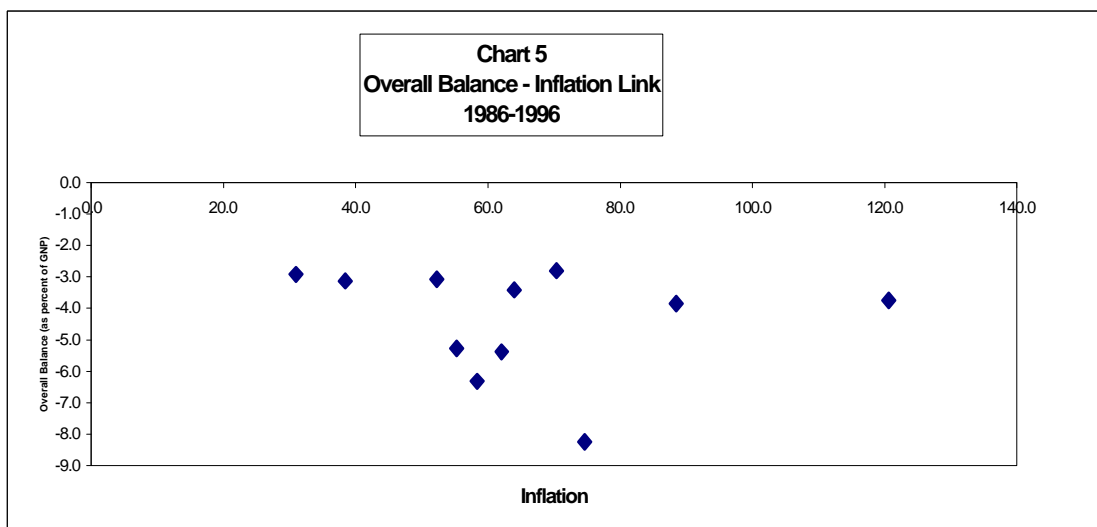
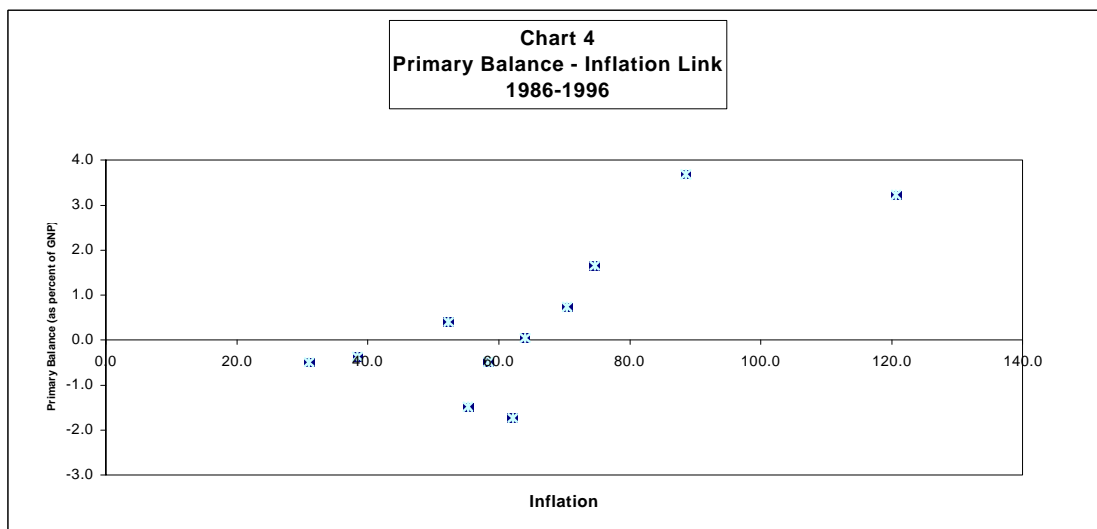
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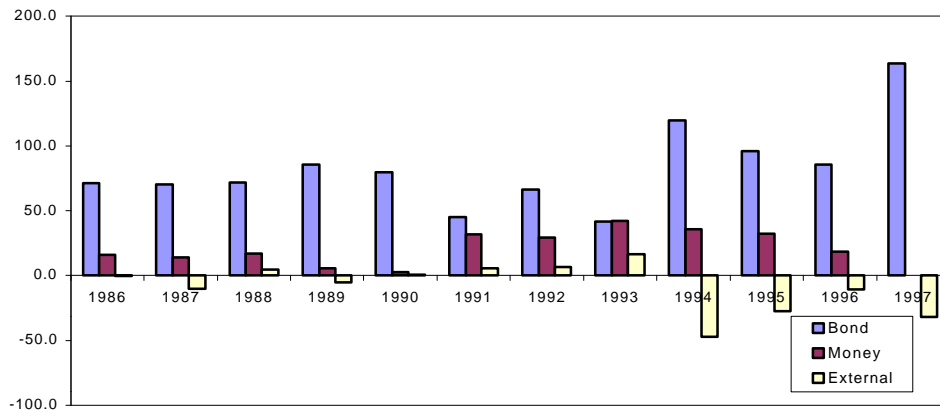
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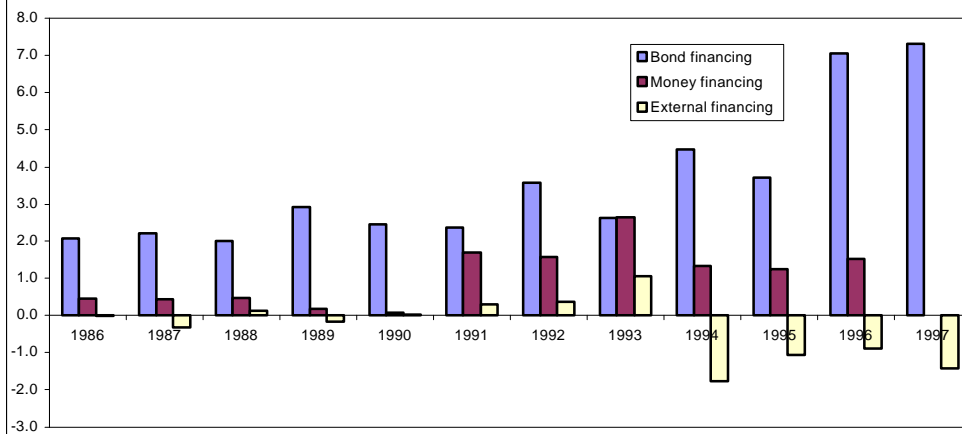


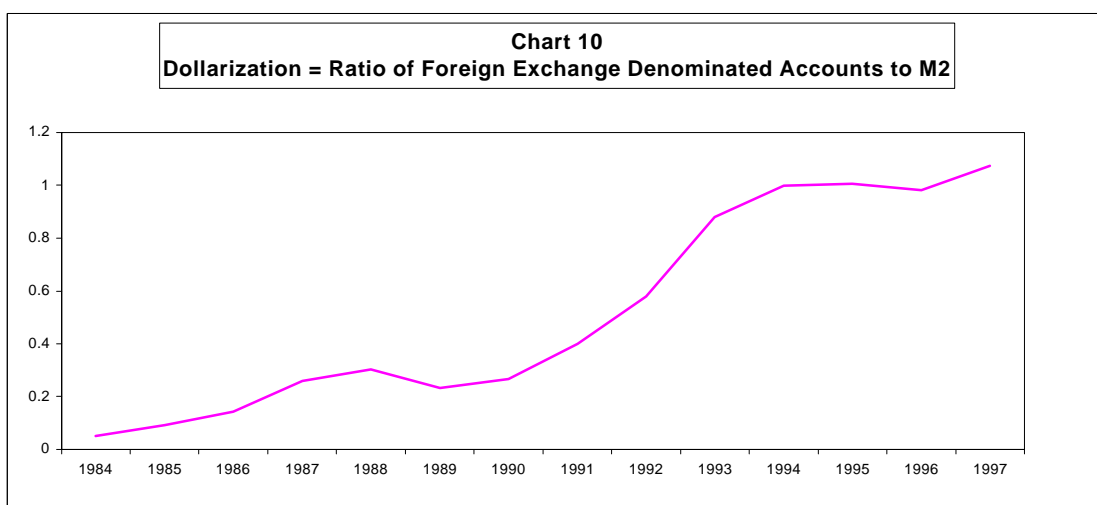
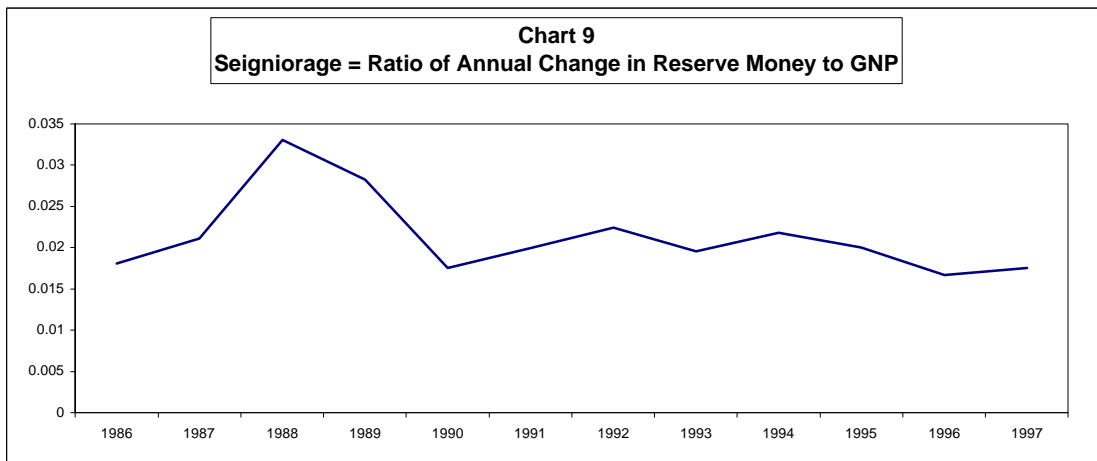
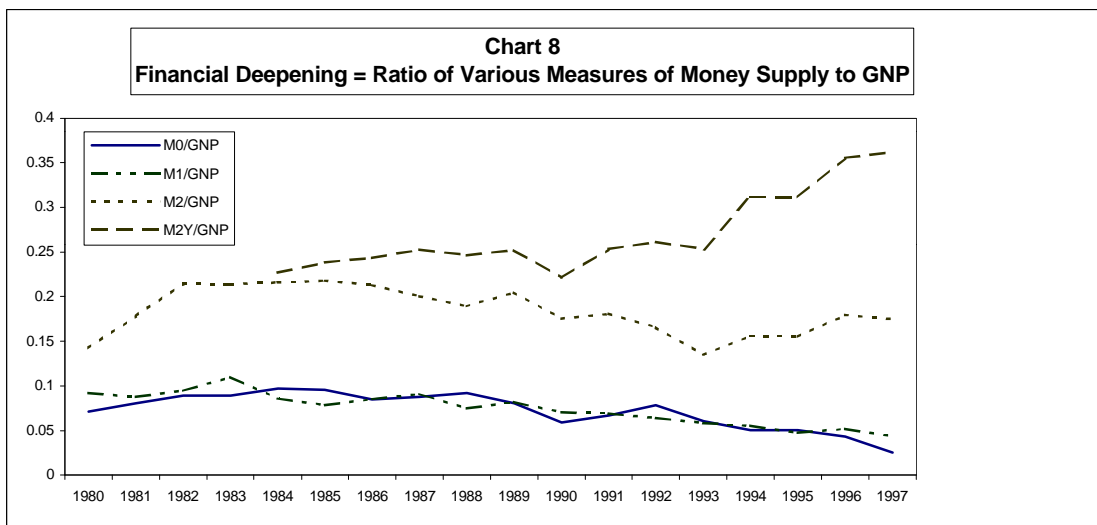


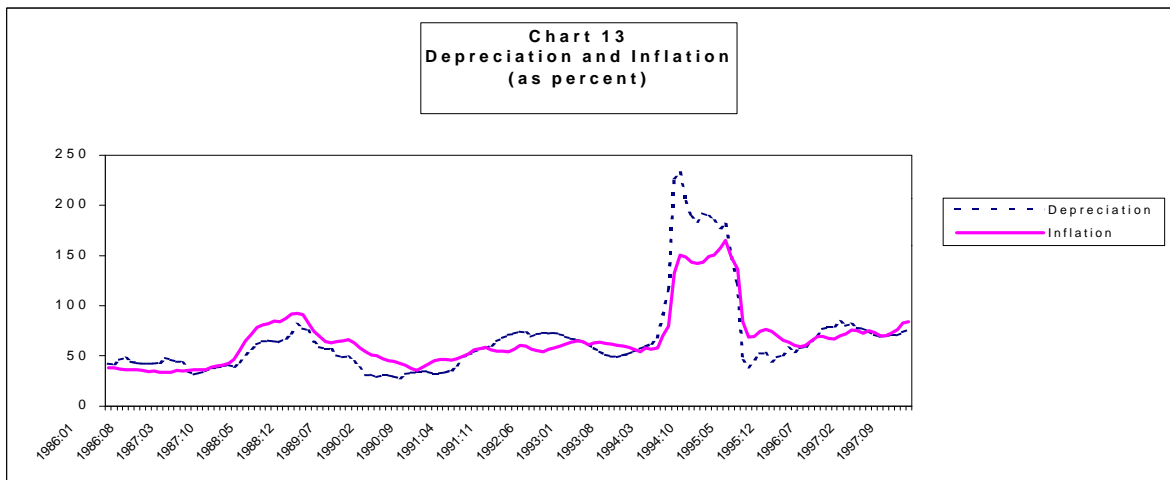
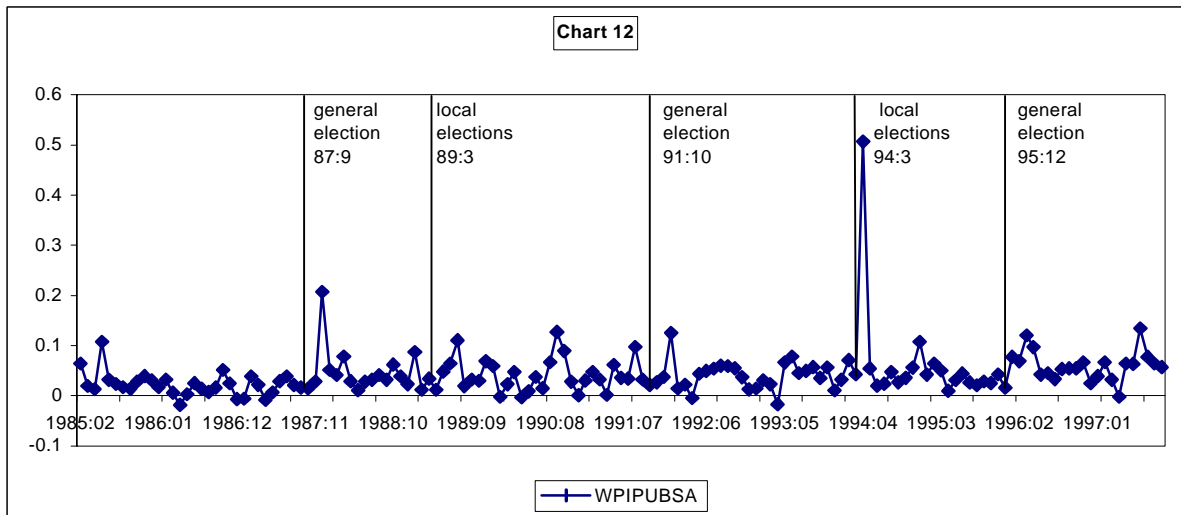
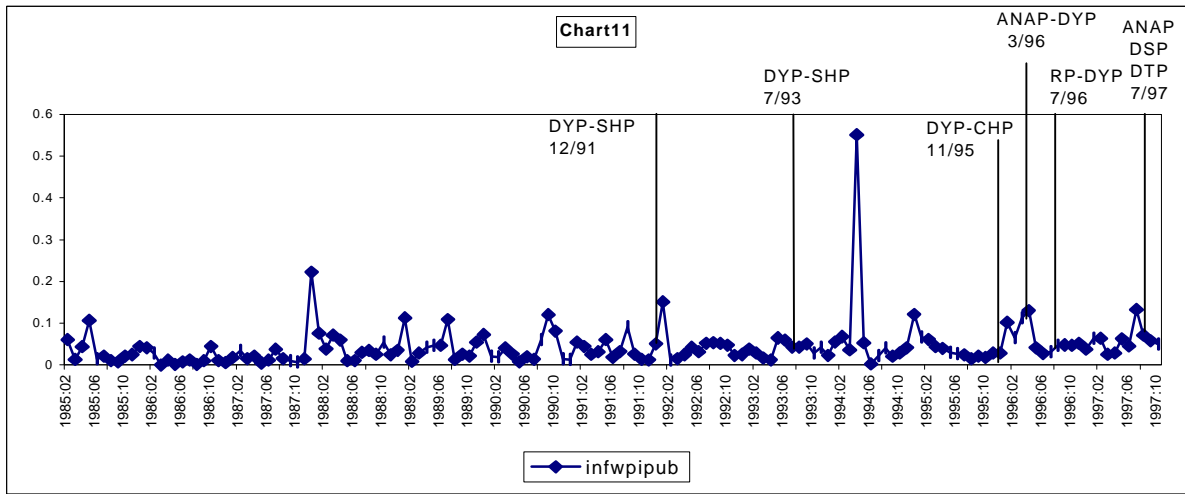
**Chart 6**  
**Financing Mix of the Consolidated Budget, 1986 - June 1997**  
 (as percent of total financing need)



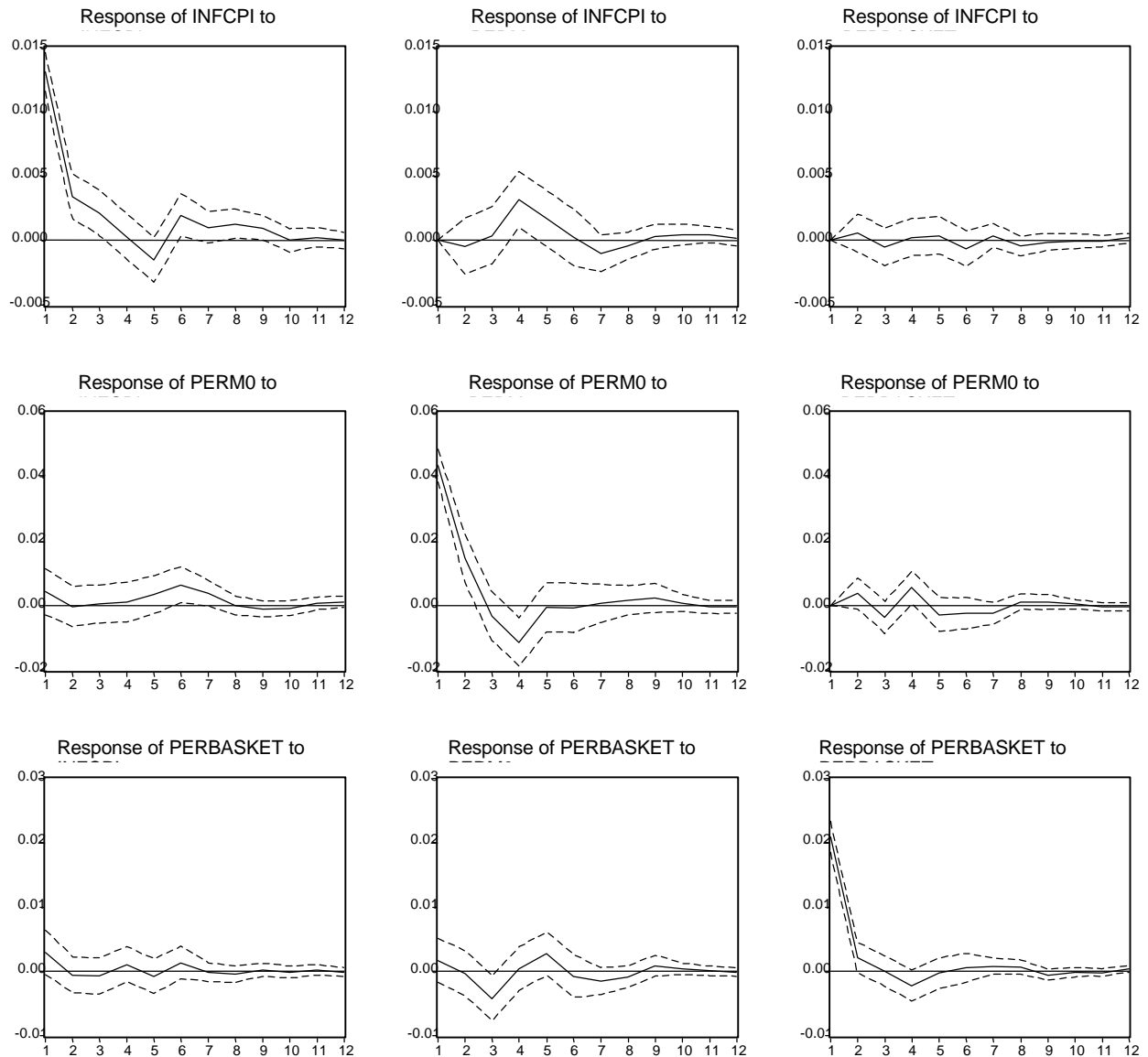
**Chart 7**  
**Financing Mix of Consolidated Budget, 1986 - June 1997**  
 (as percent of GNP)







**Chart 14**  
**Response to One S.D. Innovations  $\pm 2$  S.E.**



**Table 1**  
**Variance Decomposition**

<b>Variance Decomposition of INFCPI:</b>				
Period	S. E.	INFCPI	PERM0	PERBASKET
1	0.013	100	0	0
2	0.014	99.70	0.11	0.18
3	0.014	99.50	0.18	0.32
4	0.014	94.47	5.19	0.33
5	0.014	93.17	6.42	0.39
6	0.014	93.08	6.31	0.59
7	0.015	92.60	6.74	0.65
8	0.015	92.49	6.76	0.74
9	0.015	92.48	6.77	0.74
10	0.015	92.39	6.86	0.75
11	0.015	92.30	6.94	0.75
12	0.015	92.28	6.95	0.76
<b>Variance Decomposition of PERM0:</b>				
Period	S. E.	INFCPI	PERM0	PERBASKET
1	0.044	0.93	99.07	0.00
2	0.046	0.84	98.50	0.66
3	0.047	0.84	97.87	1.29
4	0.048	0.83	96.62	2.56
5	0.049	1.29	95.82	2.89
6	0.049	3.01	93.91	3.08
7	0.049	3.59	93.11	3.31
8	0.049	3.58	93.06	3.36
9	0.049	3.62	92.98	3.40
10	0.049	3.65	92.95	3.40
11	0.049	3.67	92.92	3.41
12	0.049	3.73	92.86	3.41
<b>Variance Decomposition of PERBASKET:</b>				
Period	S. E.	INFCPI	PERM0	PERBASKET
1	0.021	1.91	0.65	97.44
2	0.021	1.96	0.67	97.37
3	0.022	2.01	4.44	93.55
4	0.022	2.21	4.41	93.38
5	0.022	2.30	5.86	91.84
6	0.022	2.66	5.95	91.39
7	0.022	2.65	6.41	90.95
8	0.022	2.69	6.54	90.77
9	0.022	2.69	6.68	90.62
10	0.022	2.69	6.71	90.60
11	0.022	2.70	6.71	90.59
12	0.022	2.71	6.71	90.58
<b>Ordering:</b> INFCPI PERM0 PERBASKET The endogenous variables included in the unrestricted VAR are CPI based inflation, INFCPI, percentage change in the central bank money, PERM0, percentage change in exchange rate basket (the central bank buying rate as a weighted average of the U.S. Dollar and the Deutsche Mark with weights of 40 percent and 60 percent, respectively), PERBASKET, and three exogenous variables (a constant, a dummy for 1994 crisis, and the controlled component of wholesale price inflation)				